RFIDEAS

E/IP

Configuration and User Manual for PLC and PAC

99009140 F

Thank You!

Congratulations on the purchase of your EIP device. RF IDeas hopes you enjoy using our products as much as we enjoyed creating and developing them. Configuration is easy, so you will be able to quickly take advantage of a more secure environment in your business, school, or organization.

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Please call our sales department if you have any questions or are interested in our OEM or Independent Developer's programs.

Thank you,
The RF IDeas Staff

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Glossary Of Terms

ACP: ASCII Command Protocol

BootP: Ethernet Boot Protocol

CSN: Card Serial Number

EIP: Ethernet Industrial Protocol

PoE: Power over Ethernet

PLC: Programmable Logic Controller

SDK: Software Developer's Kit. Software Developer's Kits from RF IDeas provide the high level command capabilities to integrate software applications to our devices.

UID: Unique Identifier

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The Basics

1

Overview

Standard

The PoE reader follows the IEEE 802.3af-2003 standard.

Power is supplied in common mode over two or more of the differential pairs of wires found in the Ethernet cables. The power comes from a power supply within a PoE-enabled networking device, such as an Ethernet switch. It can also be injected into a cable run with a midspan power supply.

Power is supplied to the reader over the Ethernet connection in common mode over two or more pairs of wires on a PoE enabled network. The power is provided by a PoE router, Ethernet switch or can be injected into the cable with an additional midspan power supply. Midspan power supplies are available over the counter in most computer hardware stores or from catalog providers.

Equipment Needed

- Allen Bradley / Rockwell E/IP compatible PLC, PAC or equivalent
- RJ45 patch cable
- PoE capable network port, local router or power injector.
- PC (for initial setup) running:
    - -- Microsoft Windows
    - -- Telnet or other serial communications software and/or pcProxconfig5 application

Configuration 2

Getting Started

Setting up the E/IP reader for use

The configuration of the reader in most installations requires minimal changes for implementation. However, there are options for configuring the reader. In any situation, setup may need to be done in at least one of the methods described in this manual. Follow the details to establish the communication settings and credential formats you will need to get the end application running right the first time. A typical installation will involve the following:

1. Make basic network connections.
2. Establish an IP address for the reader.
3. Configure the data mode: Listen or Polling
4. Configure the reader credential type(s) and associated data format.
5. Configure the PLC Assembly instance.
6. Write the end PLC application code.
7. Install the reader at the installation site.

Making the basic network connections

The reader must be connected to a PoE capable connection to provide power to the reader and its communication dongle. For direct connection to the PLC, a simple network crossover cable can be used once the reader is configured.

Connect the reader to the PoE capable port. If one is not available, or for temporary configuration purposes, a power injector can be used. If using a power injector, refer to the manual included with the power injector for instructions on proper connection. Once the PoE network provides power to the reader, a beep will be heard and the LED will illuminate red indicating the physical connection has been made and the port is powering the reader.

Establishing an IP address

Once the physical connections have been made, the reader will request an IP address from the router or server. A dynamic address can be assigned by the network. Dynamic addresses can change as other devices are added to the network the PoE device is connected to. Static IP addresses are constant and therefore recommended.

Most networks do not support BootP directly. On the administrator PC, the Rockwell BootP Server may be used to assign an IP address. RsLinx or RSLinx Classic may also be used. An IP address pool should be established for large quantity reader deployment. For a direct PLC to reader connection; a static IP address is required.The next section details how to assign an IP address using the BootP utility from Rockwell.

BootP Quick Setup

1. Take note of the MAC address from the side panel of the PoE dongle.
2. Download and install the Rockwell BootP Server on the PC containing your RS Logix 5000 programming suite. A standalone BootP server can be obtained from Rockwell. The current version at time of this publication is 2.3.2. A copy can be obtained from our website at www.RFIDeas.com/Software/EthernetReaders/EIP/
3. Start the BootP Server application.
4. Double click on the MAC address noted earlier from the side of the PoE dongle which should be displayed in the Request History.
5. In the dialog box that appears, fill out your IP, name and description.
6. Be sure that the IP is displayed correctly in the Relation list and close the BootP server.
7. Save the settings to your Bootp Config File when prompted.

Reader Configuration

The reader requires some configuration prior to use. There are many ways to configure the reader. The IP address and internal mode can be configured through a web browser or through Telnet to port 9999.

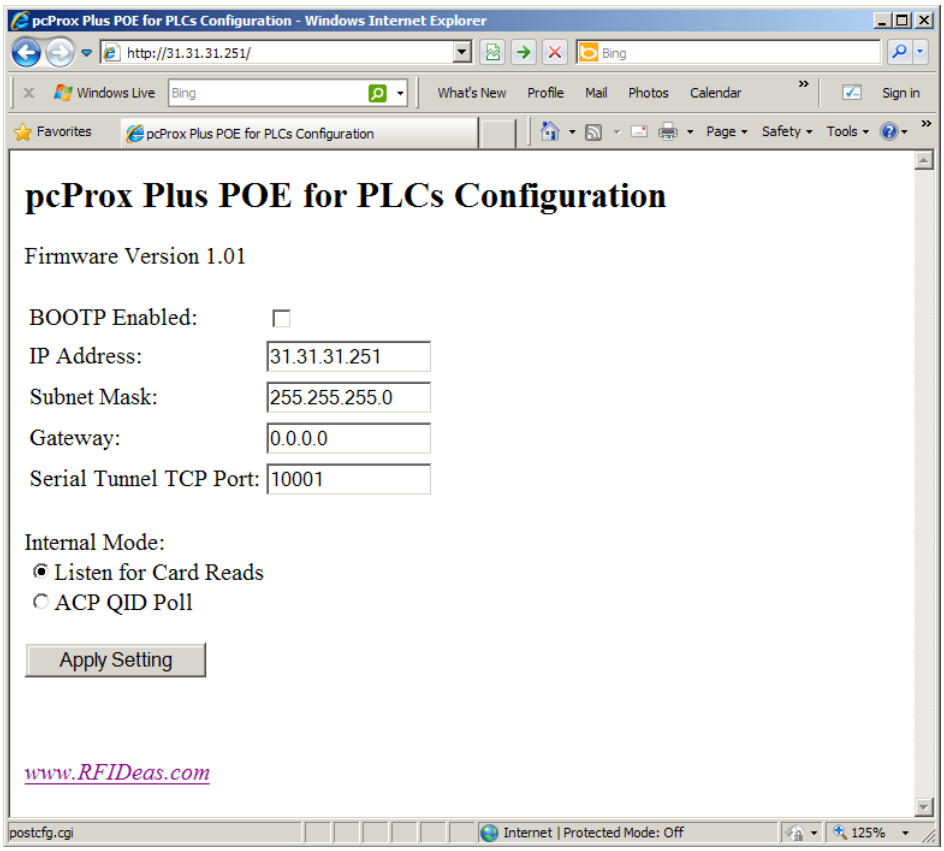
The reader can also be configured to change the credential ID types that are supported, set the device logical unique ID and format the ID data output. To do this, the pcProxConfig utility can be downloaded or direct configuration can be performed through a Telnet session to port 10001.

In any situation, the reader will first need to have its IP address assigned and the internal data mode set.

Configuring IP and Internal Data Mode from a Web Browser

From the web browser, type in the local IP address assigned to the PoE E/IP reader as shown.

Example: //52.46.49.44



Configuration Options

BOOTP Enabled: When checked, this will enable the bootstrap protocol. Unchecked will allow static IP address configuration.

IP Address: Displays the current IP address in the text box. Here, the IP address of the PoE Reader can be edited if BOOTP is disabled. The address can be either dynamically assigned DHCP or a static IP address.

Subnet Mask: Displays the current subnet mask in the text box. Here the subnet mask used by the PoE reader can be edited. Typically, the subnet mask will be 255.255.255.0 for most networks.

Gateway: Displays the current Gateway used by the PoE reader. Here the Gateway path can be edited. Set to 0.0.0.0 if the Gateway will not be used.

Serial Tunnel TCP Port: Displays the current port address of the serial over Ethernet tunnel. Here the TCP Port used by the serial tunnel can be edited. Default is 10001 and typically does not need to be changed. Note: The TCP serial tunnel should not be set to port 80 or 9999 as port 80 is reserved for the web configuration menu and 9999 is reserved for the Telnet configuration menu.

Internal Mode: Here two radio button choices are shown. Select either "Listen for Card Reads" or "ACP QID Poll" depending on your intended use. See "Configuring the Internal mode"

Internal mode

By default, the internal data mode is set to Listen mode. If this is the mode desired and a standard RF IDeas reader is attached (81 in the model name), this step can be skipped. If the reader is a SDK model (82 in the model name) the mode must be set to Polling mode.

The PoE for the PLC reader module offers two data modes to send data over the E/IP network to the PLC: Listen mode and Polling mode.

Listen Mode: Utilizes the reader's asynchronous serial communication to send ID data. When an ID is presented under Listen mode:

- Sequence number is incremented
- ID bit count field is set to one
- ID data will be present

The data sent to the PLC will be valid as long as the ID remains present in the reader's communication field. Once the card is removed, the reader module will clear the ID data available to the PLC. This mode will set a one in the ID Bit Count field when data is available giving a boolean method of triggering on card presence in addition to the sequence number. Listen mode offers the ability to adjust the data sent from the reader to simplify some programming at the PLC level. The valid ID length can be set in the reader so only valid data lengths are acknowledged when present. Depending on the data sent, Listen mode can be the fastest method of retrieving ID data.

Polling Mode: Sets the reader to poll for updated ID data continuously. When an ID is presented to the reader in Polling mode:

- Sequence number is incremented
- ID Bit Count Field reports the ID bit count
- ID Data will be present

The data sent to the PLC will be valid as long as the ID remains present in the reader's communication field. Once the card is removed, the reader module will clear the ID data available to the PLC. This method offers the addition of an ID Bit Count in the assembly instance that can be used to verify that the ID is the correct data length. The valid ID length can also be set in the reader so only valid data lengths are acknowledged when present.

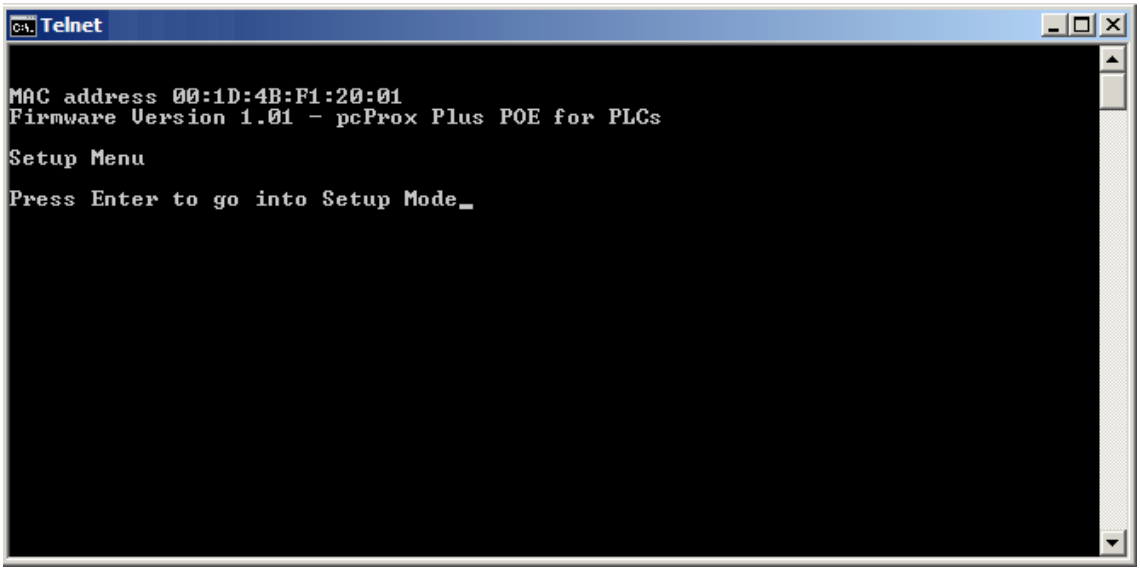
Configuring IP and Internal Data Mode from a Telnet Session

From Windows, click start > Run and then type CMD to access the command line window.

From the command prompt, type "telnet", the assigned IP address of the PoE reader followed by 9999.

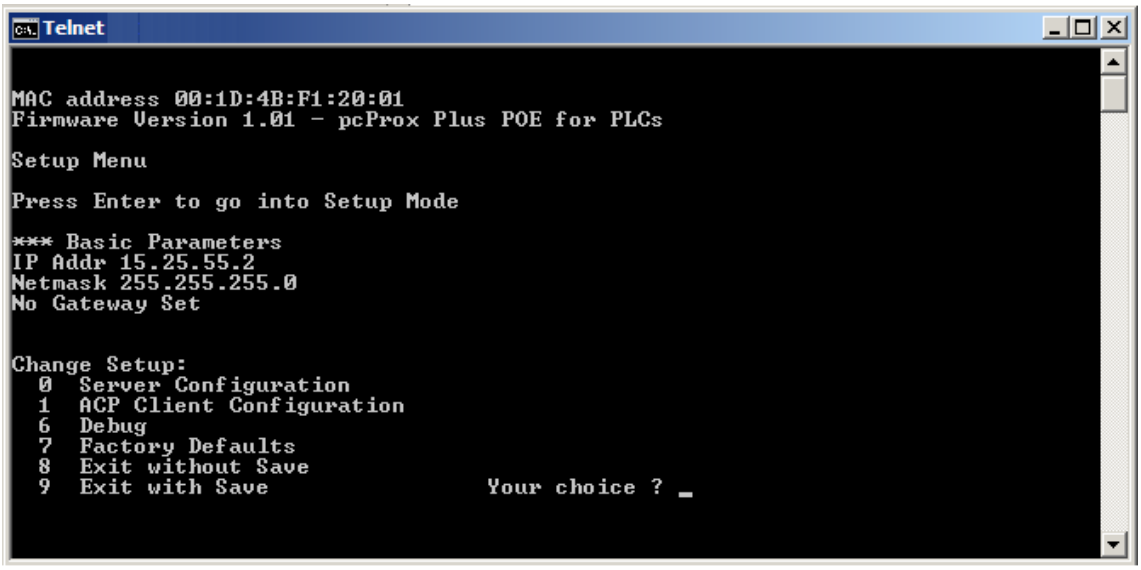
Ex: c:\>telnet 52.46.49.44 9999.

Once connected, the user will be prompted to enter setup mode:


Telnet
MAC address 00:1D:4B:F1:20:01
Firmware Version 1.01 - pcProx Plus POE for PLCs
Setup Menu
Press Enter to go into Setup Mode_

This will bring up the configuration menu options. If the Telnet session fails to connect, verify the IP address has been entered correctly.

Telnet Menu Options



0 – Server Configuration

Edit the server IP address currently assigned to the PoE reader

Enter the IP address when prompted.

Note: The device will display the current entry in brackets (xx). Pressing enter will advance to the next number entry.

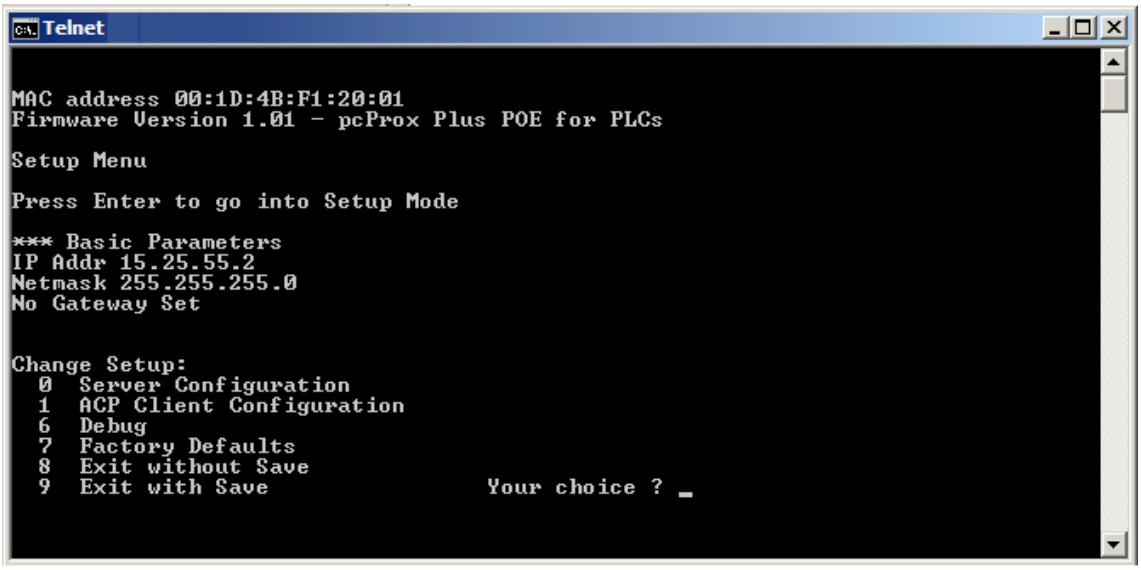
After the IP address has been edited, the user will be prompted to enter the subnet mask in the same manner. Once all edits have been made, "set Gateway IP Address (N)" will appear. Press Y, then enter to change to an alternate Gateway address. Otherwise press enter at the prompt to leave the entry as it is. In most configurations, it is not necessary to edit the Gateway setting.

The user will then be prompted with "Serial Tunnel TCP Port: (10001)?" Here the user can change the port address of the serial over Ethernet tunnel. The default is set to 10001. It can be changed to any non-conflicting port address that is not presently in use (Port 80 is reserved to the web configuration menu. Port 9999 is reserved to the Setup menu). In a typical configuration, it is not necessary to edit this port setting. Pressing enter will accept all changes and return to the main menu. At this point, the settings have not been saved. To save the changes, press 9 and enter from the main menu.

1 – ACP Client Configuration

Sets the "ACP Client Mode" and "ACP Poll Interscan Delay". The user can select either "Listen" or "Poll" modes. "Listen" allows the device connected to Listen for a card to be read. "Polling" allows the user to continuously poll the reader every 250 ms to 2 seconds for changes in the ACP QID (Queued ID).

Telnet Menu Options (cont.---)



Pressing 1 and then enter will display “ACP Client Mode (0=Listen, 1=Poll): (1)?”. The default is set to 1.

Pressing enter again will display “ACP Poll Interscan Delay (250..2000 ms): (250)?

Note: See Input / Output Assembly options.

6 – Debug

Sets the PoE to continuously read out the packet transfers. Press Escape to stop the process.

7 – Factory Defaults

Resets the PoE to defaults.

Note: This function will not reset the Server configuration (IP address, Gateway or subnet mask)

8 – Exit without Save

This option will exit the setup menu without saving any changes made after the start of the session.

9 – Exit with Save

This option will exit the setup menu and save any changes made after the start of the session.

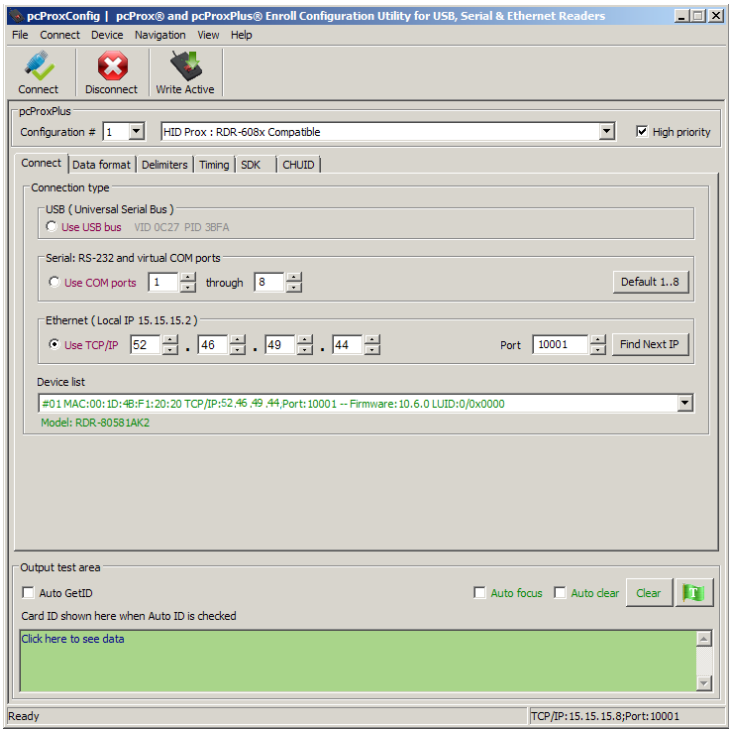
By default, all readers are shipped to detect standard ID formats and a typical data length for the model. To achieve the proper data output for a required application, data formatting can be changed to the appropriate settings through a variety of commonly used settings. The pcProxPlus™ line of readers can be configured to the desired ID type by choosing from different standard brands and/or formats.

If additional configuration is necessary for the reader to work in the intended application, this can be done by using the pcProxconfig application or directly through the serial over Ethernet tunnel using a Telnet session.

Configuration using pcProx config:

The pcProx config application, version 5.0.4 or higher can be downloaded and installed from our website at www.RFIDeas.com/software.

Open the pcProx config utility.


pcProxConfig | pcProx® and pcProxPlus® Enroll Configuration Utility for USB, Serial & Ethernet Readers
File Connect Device Navigation View Help
Connect
Disconnect
Write Active
pcProxPlus
Configuration # 1
HID Prox : RDR-608x Compatible
High priority
Connect Data format Delimiters Timing SDK CHUID
Connection type
USB (Universal Serial Bus)
Use USB bus VID 0C27 PID 3BFA
Serial: RS-232 and virtual COM ports
Use COM ports 1 through 8
Default 1..8
Ethernet (Local IP 15.15.15.2)
Use TCP/IP 52 . 46 . 49 . 44
Port 10001
Find Next IP
Device list
#01 MAC:00:1D:4B:F1:20:20 TCP/IP:52.46.49.44,Port:10001 -- Firmware:10.6.0 LUID:0/0x0000
Model: RDR-80581AK2
Output test area
Auto GetID
Auto focus
Auto clear
Clear
Card ID shown here when Auto ID is checked
Click here to see data
Ready
TCP/IP:15.15.15.8;Port:10001

Click on the radio button under Ethernet next to "TCP/IP."

Enter the IP address of the reader and click on connect.

Once connected, the reader will appear in the device list drop down menu.

Configure the data format, timing or other settings as needed and click the write active.

For pcProx plus models, choose the configuration number from the drop down menu and then choose the appropriate ID type for each configuration. When finished, choose write active from the menu bar.

Configuring multiple identical readers

For customers that have more than one reader with the same configuration, use the hardware configuration files to simplify the process.

To create one, set a reader to the needed configuration in the end application. Once the settings are edited on the first reader by "Write Active"; save them to a template file. To do so:

1. Click on File>>Save device data to Hwg+ file
2. Type in an easy to remember name for your file.
3. Save the file to a known directory on your PC.
4. Disconnect the reader.
5. Connect the next reader to be configured.
6. Click connect from the menu bar.
7. Choose File>>Open hw/hwg+ file.
8. Navigate to the directory where the file was previously saved.
9. Click on the file and then click open.
10. Click on "Write Active" from the menu bar.

The settings are now activated on the new reader. Repeat this process for each reader in the installation.

Configuring Through ACP Commands 3

ACP Overview

The E/IP PoE for PLC reader uses some ACP commands internally. However, there are many commands that can be used to choose configuration ID types, change data formatting and adjust parity bits among other commands. In Listen mode, the reader uses delimiters for framing the ID data. Any changes to pre or post data delimiters will be over-written by the reader. In Polling mode, all pre and post delimiters are not used. This manual will provide a brief overview for accessing the commands and their general structure. For more information or to see a full list of available commands, see the ASCII Command Protocol manual.

ASCII Command Protocol (ACP) allows direct configuration of the device without downloading an application or creating a proprietary interface. This feature is available on CDC, Serial, PoE and Ethernet based readers. The serial Prox reader communicates using ASCII commands. The reader then parses the command, performs the operation, and may display the result or an error code. All command strings begin with the prefix rfid: and end with a Return key (Enter), CR or LF.

Communication

Ethernet and PoE based readers will communicate through a serial tunnel over the Ethernet connection. The EIP PoE readers will require a Telnet session to communicate to the reader.

ACP commands can be sent directly to the reader through the serial tunnel port. This port is defaulted to port 10001 unless changed within the configuration setup menu accessed through the web browser.

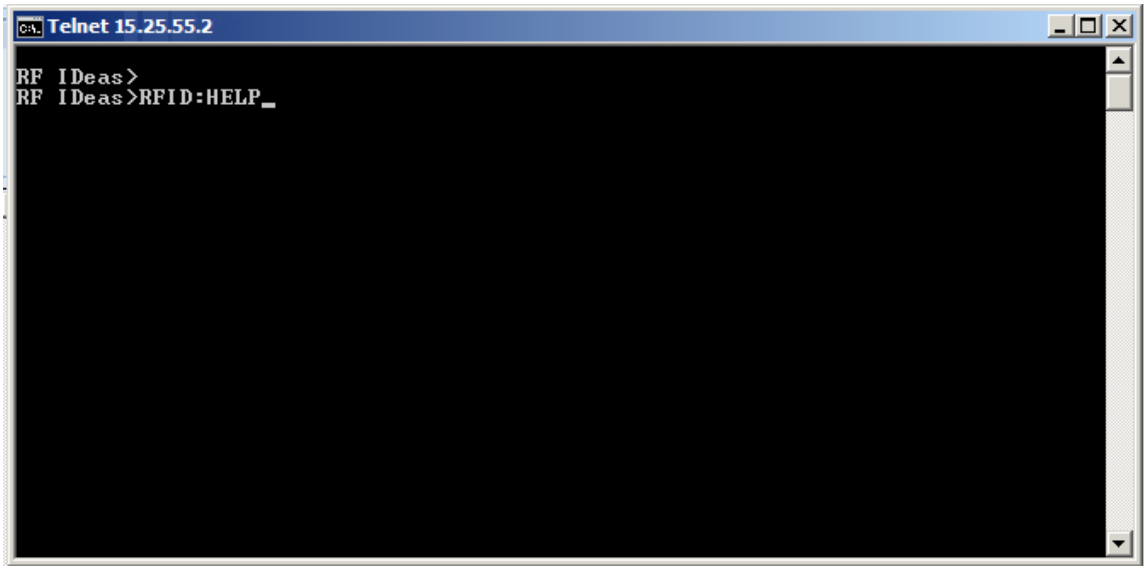
From Windows

Go to Start>>Run and type CMD then press enter to open a dos window

(From Windows 7, Go to Start then type CMD in the search box and press enter)

At the command prompt, begin a Telnet session by typing: Telnet {IP address} 10001 where {IP address} is the IP address assigned to the reader.

Example: c:\>telnet 52.46.49.44 10001



When the Telnet session is started, press enter to display the RF IDeas prompt.

At the prompt, type RFID:HELP to see a listing of variables and their command syntax.

To see what the reader is currently set to for the current configuration, type: RFID:VAR

To make the necessary changes to the reader configuration, type: RFID:CFG.WRITE
This will save the changes (in RAM) to FLASH memory and activate the settings that were modified.

Command Structure

Commands are not case sensitive. Characters assigned to variables however, are case sensitive.

- All commands begin with rfid followed by one or more token strings with a period delimiter character between multiple tokens.
- Functions must end with a CR or LF.
- Any control characters other than CR, LF, and backspace terminate the command.
- Variables can be assigned a value with an equal sign followed by the value or queried with a question mark.
- The Escape key cancels a command.

The general syntax is:

Rfid: TOKEN { DELIMITER TOKEN } { { =Value} | {?} }

Command structure falls into one of three groups:

1. Perform a function.
2. Assign a variable.
3. Query a variable.

Perform a Function

A function performs an operation that may or may not display any results. A function may not be queried. An example of a function is to write the variable settings to flash memory using:
rfid:cfg.write CR

Certain functions that display a value or series of values display the string between curly braces for easy parsing. For example, the **rfid:qid** function output displays:

{0x00BB,1,0x00,80;0x000000801CD1931B2F14}

Assign a Variable

There are three types of variables:

1. Boolean
2. Integer
3. Character

Examples of Boolean Assignments

rfid:op.beep=0
rfid:op.beep=true
rfid:op.beep=False
rfid:op.beep=F

Examples of Integer Assignment

rfid:out.led=0003
rfid:out.led=3

Note: All 16 bit integer values require a hexadecimal entry.
For Example: pcProx Plus card types: **rfid:cfg.card.type=0xEF04**

Examples of Character Assignment

rfid:Delim.Chr.fac=':' CR
rfid:Delim.Chr.fac='x3a' CR

Examples of Prox Plus Configuration

To set configuration #1 to read Mifare CSN the following commands would be entered:
rfid:cfg=1 CR
rfid:cfg.card.type=0x7F41 CR
rfid:cfg.write CR

The reader will then respond with {ok}

To then set configuration #2 read HID porxII the following commands would be entered:

rfid:cfg=2 CR
rfid:cfg.card.type=0xEF04 CR
rfid:cfg.write CR

The reader will then respond with {ok}

Query a Variable

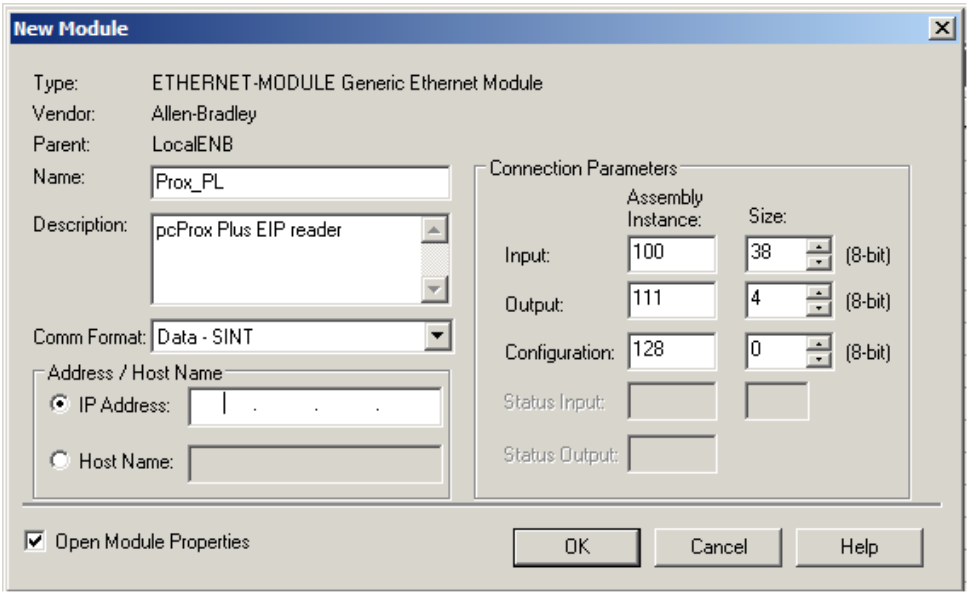
A Variable can be queried to display its current value. Variables are set and stored in RAM and are lost when the utility is closed. Use rfid:var to display the list of current ram settings. The rfid:cfg.write function writes the RAM variables to flash memory. If a variable is changed incorrectly, the settings can be replaced with those from flash using the rfid:cfg.read command.

- The output of the variable displays between curly braces.

  Example: RF IDeas>rfid:out.led?
  {3}

Booleans display as true or false.

RS Logix 5000 Configuration



1. Open the intended project in the RS Logix 5000 program.
2. In I/O configuration under the Controller Organizer, locate the Ethernet port.
3. Under the Ethernet I/O configuration, add a Generic Ethernet Module.
4. In the Name dialog box, enter a descriptive name to identify the module.

5. For Comm format, select 'Data-SINT' from the drop-down menu.
6. In the module properties menu, set the IP address of the PoE reader.
7. Set an Input assembly instance to 100 and set the size to 38 bytes.
8. Add an Output assembly instance 111 with a size of 4 bytes to control the reader LED and/or beeper from within the PLC Main Program. If no control of the reader LED or Beeper will be necessary, set an Output assembly instance to 110 and set the size to 2 bytes. See Input/Output Assembly options.
9. Set the Configuration Assembly Instance to 128 with a size of 0 bytes as this is unused.
10. Press finished to add the module to the configuration. The reader is now configured.

Note: The assembly instance direction is always related to the origination. Input Instance refers to data flow from the Controller to the device and an output instance refers to data flow from the device to the Controller.

You should now see three entries in the Control tags menu. Each will have the name of module specified in step 4 followed by C, I and O. These refer to the Control, Input and Output respectively.

100 Input	
Offset	Description
0	Sequence Low
1	Sequence High
2	LUID Low
3	LUID HIGH
4	Bit count of ID
5	zero padding
6 .. 37	ID data bytes

110 Output	
Offset	Description
0	Unused
1	Unused

111 Output	
Offset	Description
0	LED Control
1	Reserved
2	Reserved
3	Beeper Control

Input Assembly 100 Offset Options

Input assembly parameters are derived from ACP command and function calls. See the ACP command list for more information.

Sequence No. (offset 0:1): Location of sequence number. The number is incremented to indicate a change in ID data and Bit Count

LUID (offset 2:3): Logical Unit ID – Unique Identifier for the reader (if assigned during reader configuration)

ID Bit count / Present (offset 4): Total bit count of incoming ID in Polling mode; In Listen mode, 1 = card present, 0 = no card present

Zero Padding offset 5: unused byte to separate Bit count from Card ID

Card ID data bytes offsets 6 through 37: Location of ID raw data

Note: See "Internal mode" under "Entering the configuration menu from a web browser" section and/or "1 – ACP Client Configuration" under "Telnet Menu Options" for more information on Polling and Listen modes.

Output Assembly 110 Offset

Output assembly parameters were not used for the 110 instance. Setting the Output Assembly instance to 110 is used only if control of the reader's internal LED or beeper will not be made in the intended PLC application.

Output Assembly 111 Offset Options

Output assembly parameters are derived from ACP command and function calls. See the ACP command manual for more information.

LED Control offset 0:

0 (0x00) = Off – Turn off the LED
1 (0x01) = Red – Illuminate the Red LED
2 (0x02) =Green – Illuminate the Green LED
3 (0x03) =Amber- Illuminate both LED's for Amber
255 (0xFF) = Allow the reader to automatically control the LED (Red – no card data, Green – valid card data received)

Beep Now Offset 3

The reader is capable of playing a short beep or long beep. The reader will sound one short beep by default when a card is read unless disabled in the reader.

Sending the commands below will sound the reader's beeper immediately after received:

Note: Only changes from a previous value will be sent to the reader. The previous value should be cleared for 200ms prior to sending the same value again. For example, send 2 to beep twice. To beep twice again: send 0, wait 200ms, then send 2 again.

1 (0x01) = Short Beep – A short beep is played
2 (0x02) = Two Short Beeps – a short beep is repeated twice
3 (0x03) = Three Short Beeps – a short beep is repeated 3 times
4 (0x04) = Four Short Beeps – a short beep is repeated 4 times
5 (0x05) = Five Short Beeps – a short beep is repeated 5 times
101 (0x65) = One Long Beep – a Long beep is played
102 (0x66) = Two Long Beeps – a long beep is repeated twice

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